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Abstract: *»Globalisierung, Kommunikation und Raumkonzepte in der Globalgeschichte«*. To study changing patterns of communication, interactions and transfers is a principal focus of global history. Such shifting connectivity patterns produce new spaces that co-exist with and are complementary to geographic space. The creation, transformation and interaction of these spaces become a central object of study in global history if we want to understand processes of globalization – such as the alleged "shrinking of the world". At the same time, practitioners of global history constantly struggle with spatially delineating their field of study. Therefore, global history needs a new understanding of space that provides a framework for both – looking at space as an *object of study* as well as clearly identifying and demarcating the *field of study*. In this article, I propose an abstract, multi-layered and strictly relativistic understanding of space that will help the global historian to better master both challenges.

Keywords: space, globalization, communication, global history, telecommunication, telegraphy.

> You cannot have a geography of anything that is unconnected. No connection, no geography. No connections means mere checklists without any relations between the items. […] As human geographers, we have at the forefront of our concern the way connections are made between peoples and places in all sorts of different spaces, and how these spaces are being constantly restructured and reshaped by the human presence.
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> Peter Gould, "Dynamic Structures of Geographic Space," in *Collapsing Space & Time. Geographic Aspects of Communication & Information*, ed. Stanley D. Brunn and Thomas R. Leinbach (London: HarperCollins, 1991), 4.

Global History as the History of Global Connections

In his article on "Cross-Cultural Interaction and Periodization in World History," Jerry Bentley proposed a specific system of historical periodization for

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use in world history that could "avoid ethnocentric periodizations that structure the world's past according to the experiences of some particular privileged people." Cross-cultural interaction was to be the focus of this system of periodization.[1] Patrick Manning commented very favourably on the article, but demanded further qualification of what cross-cultural interaction exactly encompasses. "For if one accepts cross-cultural interaction as the criterion for periodization in world history, one tends at the same time to accept such interactions as the main subject matter of world history. This big step requires some discussion."[2] Several years later, Manning opened the first chapter of his seminal book *Navigating World History* saying, "To put it simply, world history is the story of connections within the global human community."[3] Manning had taken the "big step" himself.

In arguing for a *New Global History*, Bruce Mazlish identifies the tracing of processes of globalization "as far back in the past as seems necessary and useful" as one principal focus of global history.[4] And as growing contacts, transfers and entanglements between world regions are principal markers of globalization, this definition automatically puts their study at the heart of global history. Similarly, in his prolegomenon to the first issue of the *Journal of Global History*, Patrick O'Brien introduces two distinct approaches to modern global history. While one is primarily concerned with comparative histories, the other one focuses on connections between people(s). Here, encounters, contacts or interactions lie at the heart "of most economic, social, political, military, cultural, religious, technological and other conceivable types of change studied by historians."[5] This approach mirrors much of William H. McNeill's perspective on world or global history as put forward, for instance, in "The Changing Shape of World History"[6] or *The Human Web*.[7]

No matter how much debate there is and how many "[h]airs may be split"[8] about the exact purpose and perspective of world or global history[9] – it seems

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1 Jerry Bentley, "Cross-Cultural Interaction and Periodization in World History," *The American Historical Review* 101, no. 3 (1996): 750.

2 Patrick Manning, "The Problem of Interactions in World History," *The American Historical Review* 101, no. 3 (1996): 771.

3 Patrick Manning, *Navigating World History: Historians Create a Global Past* (New York and Basingstoke: Palgrave Macmillan, 2003), 3.

4 Bruce Mazlish, "Comparing Global History to World History," *Journal of Interdisciplinary History* 28, no. 3 (1998): 389.

5 Patrick O'Brien, "Historiographical Traditions and Modern Imperatives for the Restoration of Global History," *Journal of Global History* 1 (2006): 4.

6 William H. McNeill, "The Changing Shape of World History," *History & Theory* 34, no. 2 (1995): 8-26.

7 John R. McNeill and William H. McNeill, *The Human Web: A Bird's-Eye View of World History* (New York: W. W. Norton, 2003).

8 O'Brien, "Historiographical Traditions," 4.

9 To my personal understanding there is little practical difference between world and global history. Therefore, I use the terms synonymously here.

to be widely acknowledged that communication, contacts and transfers between world regions occupy a central role in the study of the field. However, the evolving and constantly shifting patterns of global connections – whose study is the focal point of so much work in the discipline – invoke at least two analytical challenges directly related with our conceptual treatment of space that is a prerequisite for a focus on transfers and contacts. First, shifts in traditional time-space relations (or, as we will see, rather space-space relations) are the product of such constant changes in global connectivity patterns. As the dynamic product of transfers and interactions, space (and changes therein) must be a central *object of study* in global history – an object that is highly dynamic and features an almost infinite number of different layers. And yet, global history still has not developed an understanding or a comprehensive model of space that provides a suitable framework for the examination of these shifting relations.

Second, if one investigates communication, interactions and transfers (on whichever scale – be it national, regional or global), it becomes increasingly difficult to define a particular geographic area of study or observation. It is the essence of the object of study to transgress traditional boundaries and to detach interrelations from geographic proximity. When connections between objects stand at the centre of attention, it is hard to draw a clear analytical line between the 'objects'[10] within one's focus and those outside. Geographic definitions of space become unhelpful in doing so. Even if we follow Bruce Mazlish's second part of the definition of global history and hold that it should be concerned with "processes that are best studied on a global, rather than a local, a national, or a regional, level,"[11] the fundamental problem of delineating one's geographic field of research remains. There are not many such processes which encompass or concern the entire globe on the same level. While some of the classic examples – such as the nuclear threat or climate change – are of truly global relevance, other phenomena – such as population increase, pandemics or an anticipated expansion into (outer) space – have regional and national foci and will not touch many other places for a long time. Therefore, the entire globe might not serve well as global history's principal unit of study – even in the case of such allegedly global processes. It should rather be considered as the largest possible unit within which individual spaces of observation can constitute themselves. Therefore, in academic practice, 'global' will be used in much the same way as Mazlish, Herfried Münkler or Immanuel Wallerstein[12] use

[10] In the context of this article I use the term 'object' to refer to the places, people, institutions, things, etc. that can be arranged in space. I do this for the sake of simplicity and readability only and do not intend to make any implicit statements on historical agency.

[11] Mazlish, "Comparing," 389.

[12] For a digest of world-systems theory by Wallerstein himself see Immanuel Wallerstein, *World-Systems Analysis: An Introduction* (Durham and London: Duke University Press, 2004).

'world.' In trying to distinguish 'global history' from 'world history,' Bruce Mazlish states that "[w]orlds can also be imaginary, such as the 'next world,' meaning life after death, or they can designate a class of persons – the academic world, for instance."[13] Looking at distinctions of empires (or *Weltreiche*) Herfried Münkler holds that an empire reigns supreme in its 'world' – while there might be more than one empire in *the* world.[14] Following Münkler, 'world' is a relative term that emerges from the connections and horizons of the inhabitants.[15] Most studies in global history will use such worlds (or the connections between several of them) as their units of study rather than look at the entire globe at once. In this case, the globe is merely a sort of container unit that hosts all these different, overlapping and co-existing worlds which require their very own spatial frameworks.

Therefore, space is both an *object of study* as well as an *observational framework* within which the historian delineates his field of study. In global history, as outlined above, both these roles of space create distinct new problems. In this article I introduce an open model of space as an analytical tool which will allow practitioners of global history to overcome these problems. I start with examining and reassessing so-called processes of time-space convergence or time-space compression[16] that have become emblematic for the overall concept of globalization. Such alleged compressions or convergences are usually seen as the product of shifts in global transfer and connection patterns that lead to a shrinking of space – and yet we still lack a systematic understanding of the roles and relations of time and space in global history. I seek to establish how such processes and – most importantly – their socio-cultural consequences relate to a broader understanding of space and how they can then be systematically studied. Beyond a merely theoretical approach I frequently refer to telegraphy or modern telecommunication in order to exemplify my more theoretical points. The emergence of effective telecommunication in the nineteenth century has been described by contemporaries and modern historians alike as ushering in the 'annihilation of space and time.' It, therefore, seems to provide a particularly good example for what has been described as time-space compression. In a second part, I then try to demonstrate how the proposed model of space can also help to overcome problems of delineating appropriate units of observation.

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[13] Mazlish, "Comparing," 389.

[14] Herfried Münkler, *Imperien: Die Logik der Weltherrschaft – vom Alten Rom bis zu den Vereinigten Staaten* (Berlin: Rowohlt, 2005), 27.

[15] Ibid., 26.

[16] For the difference between time-space convergence and compression see David Harvey, "Between Space and Time: Reflections on the Geographical Imagination," *Annals of the Association of American Geographers* 80 (1900): 418-434.

Arguably electric telegraphy has not been the first communication technology to detach long-distance flows of information from 'material' movement. Acoustic or optical instruments such as drums or fire beacons had long been known and used to transmit prearranged messages at considerable speed over larger distances. In the late eighteenth century optical telegraphy had even provided a code system to quickly communicate flexible messages within a network of signalling stations. It was only with electric telegraphy, however, that telecommunications reached a stage of full technological maturity[17] which secured its widespread application and the emergence of first national and later international telegraph networks of unprecedented reach. Following the logic of network economics, the system became more beneficial and valuable to its users the further the network grew. While its optical forerunner pioneered the idea, electric telegraphy for the first time made available a communication network in which the flow of information was free from the constraints of material movement. Telecommunication had become dematerialized.

All communication naturally takes place in time and (geographic) space – pretty much as all our actions do. It is the process of transmitting information between two or more participants. As a process it takes a certain amount of time. It has a speed and duration. The participants in the communication process occupy specific positions in space. They maintain different relations to each other, have different distances between them.

In most cases of 'material' communication[18], the time it takes to transmit information between two participants is a function of their geographic distance

[17] In this context maturity means that the technology reached a degree of manageability, reliability and cost efficiency that made it appeal to potential users beyond the state. In this respect, electric telegraphy offered a number of distinct advantages over its optical counterpart. The distance between relay stations could be much higher and could extend beyond human sight. There was no need for a line of sight between relay stations and, therefore, the electric telegraph would work in impracticable terrain, at night or during periods of bad weather. The electric telegraph also had a higher information throughput than the optical telegraph. All this drastically reduced the personnel and the costs involved in telecommunication and made telegraphy a more reliable and affordable affair.

[18] As I have explained elsewhere, I do not use the terms 'material' or 'dematerialization' in a way that would withstand scrutiny from philosophers or post-Newtonian physicists. In this context, material communication involves the movement of a tangible medium (e.g., a letter, a carrier pigeon, a messenger). Strictly speaking, most forms of dematerialized communication (e.g., speaking, optical signalling, telegraphy, modern telecommunications) involve the movement of very small masses as well (e.g., the movement of air that creates sonic waves, the movement of light or the movement of electrons in a conductor). For all practical purposes of the social historian, however, these forms of communication do not involve material transport as described above. They are free from many of the limitations (e.g., of speed) that material communications has to grapple with. See Roland Wenzlhuemer, "The Dematerialization of Telecommunication: Communication Centres and Peripheries in Europe and the World, 1850-1920," *Journal of Global History* 2 (2007): 349.

(which is in turn the principal constituent of geographic space). As a rule of thumb, communication times are the larger the further the two communicators are positioned from each other. Sure enough there are many exceptions to this rule. Natural (e.g., mountains, rivers, forests, different climate zones) or artificial obstacles (e.g., unevenly integrated communication networks, borders, language barriers, tolls, immigration law) can distort the relation between communication times and geographic space. A variety of other factors can shorten or prolong communication times. Yet, as a general rule, distance and communication time in most cases grow proportionally as long as the act of communication involves materially transporting something.

The dematerialization of telecommunication profoundly changed this relation. Still, telegraphic communication over large distances had to rely on more relay stations, involved more instances of decoding/encoding and, therefore, generally took longer than transmitting a message to a nearer place. However, the influence of geographic distance as a multiplying factor of communication times had been severely diminished by the sheer speed with which a message was sent through the wire. While distance still was a factor in the equation, communication time had ceased to be primarily a function thereof. Something had changed in the traditional relationship between space and time, it seemed.

Contemporary observers found a number of terms to refer to this perceived shift. To some the change seemed dramatic enough to let them claim that the telegraph had brought about the 'annihilation of time and space.'[19] Karl Marx made a related but essentially different observation in 1857. He stated in the *Grundrisse*:

> Thus, while capital must on one side strive to tear down every spatial barrier to intercourse, i.e. to exchange, and conquer the whole earth for its market, it strives on the other side to annihilate this space with time, i.e. to reduce to a minimum the time spent in motion from one place to another.[20]

Marx did not make any explicit reference to particular transport or communication technologies in this passage, but he also perceived the shift in time-space relations, which he characterized as the annihilation of space *by* time.

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[19] Iwan Rhys Morus, "The Nervous System of Britain: Space, Time and the Electric Telegraph in the Victorian Age," *The British Journal for the History of Science* 33 (2000): 456, 463; Jeremy Stein, "Reflections on Time, Time-Space Compression and Technology in the Nineteenth Century," in *TimeSpace: Geographies of Temporality*, ed. Jon May and Nigel Thrift (London and New York: Routledge, 2001), 108.

[20] Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy* (Rough Draft) (Harmondsworth: Penguin Books, 1973), 538-539.
The original German version: "*Während das Kapital also einerseits dahin streben muß, jede örtliche Schranke des Verkehrs, i.e. des Austauschs niederzureißen, die ganze Erde als seinen Markt zu erobern, strebt es andrerseits danach, den Raum zu vernichten durch die Zeit; d.h. die Zeit, die die Bewegung von einem Ort zum andren kostet, auf ein Minimum zu reduzieren*." Karl Marx and Friedrich Engels, *Ökonomische Manuskripte 1857/58* (Berlin: Akademie Verlag, 2006), 438.

It comes as no surprise that today – in times of almost instant global communication via the internet and rapid global transport (triggered by containerization and the accessibility of air travel) – many observers share a similar impression of geographic space being annihilated. Scholars talk about the 'convergence of space and time,' an ongoing 'space-time compression'[21] or, indeed, about the '*Entmachtung des Raums*'[22] (the disempowerment of space) – all of which have also been witnessed in the second half of the nineteenth century, especially in those world regions which were then penetrated by new transport and communication technologies. Arguably, this allegedly changing relationship between time and space has attracted some scholarly attention in recent years – and yet it is still worthwhile to systematically look into this relationship. Can we isolate what exactly has changed and is it possible to construct a theoretical framework in order to instruct and systematize empirical work on the subject? While some of the terms introduced above might capture changing perceptions of and feelings towards space and time (and their relation) rather accurately, most of them are too inaccurate or hazy as to fruitfully inform empirical studies and make them comparable with each other.

Space as an *Object of Study*

All the above-mentioned concepts refer to an isolated phenomenon of globalization only and build on a single-layered definition of space that implicitly ascribes primacy to geographic space. Their central argument is that the time it takes to communicate (or travel etc.) between two places in geographic space has – in many cases – decreased massively. I believe, however, that for the study of complex processes of global communication, transfers and interactions we will have to employ an abstract, multi-layered and strictly relativistic concept of space[23] that goes beyond such a uni-dimensional approach. Just as globalization, global history needs to deal with a plurality of spaces.

> The plurality of spaces can be confounding [...]. First, it increases the confusion. And yet, it brings back a hint of the world's complexity to our image of the world, to our simplifying representations of the world. One could swee-

[21] Harvey, "Between Space and Time"; Stein, "Reflections," 106.

[22] Ulrich Sonnenmann, "Die Ohnmacht des Raums und der uneingestandene Fehlschlag der Zeitentmachtung. Zur Aporetik des Staus," in *Zeit*-Zeichen. Aufschübe und Interferenzen zwischen Endzeit und Echtzeit, ed. Georg Christoph Tholen and Michael Scholl (Weinheim: VHC, Acta Humanioria, 1990), 21 quoted in Dieter Läpple, "Essay über den Raum: Für ein gesellschaftswissenschaftliches Raumkonzept," in *Stadt und Raum*, ed. Hartmut Häußermann et al. (Pfaffenweiler: Centaurus-Verlag, 1991): 162.

[23] For a brief description of the concept of relative space and Leibniz' views on this see Martina Löw, *Raumsoziologie* (Frankfurt am Main: Suhrkamp, 2001), 27-28; Markus Schroer, *Räume, Grenzen, Orte. Auf dem Weg zu einer Soziologie des Raums* (Frankfurt am Main: Suhrkamp, 2006), 40.

> pingly say: there are as many spaces as there are fields of study, topics, media or historical agents.[24]

I would like to amend this quote from Karl Schlögel's book *Im Raume lesen wir die Zeit* with the diagnosis that there are, indeed, as many spaces as there are different forms of relations between objects. From the geographer's perspective, Peter Gould put it like this:

> In fact, for many spaces of great geographic importance the very notion of metricity may not be pertinent. What may be much more important is the simple fact of how people and things are connected together. It is the sheer connectivity of things that creates many spaces of interest to a geographer [...].[25]

Geographic space is but one – admittedly very present – form or construction of space.[26] Just as any other space, it is the sum of relations between its objects. In this particular case though, geographic distance is the sole measure of relationship. In forming our image of space, geographic space is privileged. The majority of our sensory impressions in some way or other relate to geographic space. Most of our sensory input provides us with information on geographic location – of ourselves as well as of other people or objects. Therefore, our individual images of space are massively shaped or influenced by geographic space – but not exclusively. Martina Löw explains that everyday experiences such as using telephones or computers, watching television or partaking in cyberspace also shape children's perceptions of space beyond the

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[24] Karl Schlögel, *Im Raume lesen wir die Zeit. Über Zivilisationsgeschichte und Geopolitik* (München: Carl Hanser Verlag, 2003), 69. [My own translation]
The original German version: "*Die Pluralisierung der Räume hat etwas Verwirrendes an sich […] Sie steigert zunächst die Unübersichtlichkeit. Und doch bringt sie in unser Bild von der Welt, unsere ohnehin zur Simplifikation verurteilten Repräsentationen von der Welt, eine Ahnung von der Komplexität zurück, die die Welt ist. Man könnte summarisch sagen: es gibt so viele Räume, wie es Gegenstandsbereiche, Themen, Medien, geschichtliche Akteure gibt.*"

[25] Peter Gould, "Dynamic Structures of Geographic Space," in *Collapsing Space & Time. Geographic Aspects of Communication & Information*, ed. Stanley D. Brunn and Thomas R. Leinbach (London: HarperCollins, 1991), 10.

[26] Sure enough, one could reasonably argue that *geographic space* emerges from the sum of distances between its objects and is, therefore, not "imagined" or "relativistic" but strictly "real" and "absolute." However, mind that what we think of as *geographic space* is fundamentally different from what we could call *physical space*. It is the product of projecting our three-dimensional globe on a two-dimensional backcloth. Maps, for instance, do not correctly represent *physical space*. Depending on the particular form of projection they distort distances, angles or areas to varying degrees. Beyond that well known form of distortion our internal vision of *geographic space* is also different form *physical space*. If we think of the distance between, say, London and New Delhi, we think of the distance *along the surface* of the earth (according to Google Earth roughly 4,180 miles). In *physical space*, however, the actual distance is much smaller as it would cut right through earth (very approximately 3,990 miles). While this example is of little practical purpose, it nevertheless shows how even this most "real" of spaces is merely a product of projection and imagination.

geographic dimension.[27] Since the publication of Löw's book in the year 2001, access to 'new spaces' has tremendously increased, for instance through the expansion of mobile telephony, the emergence of *multiplayer online games*, the further proliferation of email communication or the cheapening of airfares. These technologies or practices provide different impressions of space and mix with everyday perceptions of geographic space to create an individual idea of (general) space in every person depending on personal habits, needs, practices and experiences.

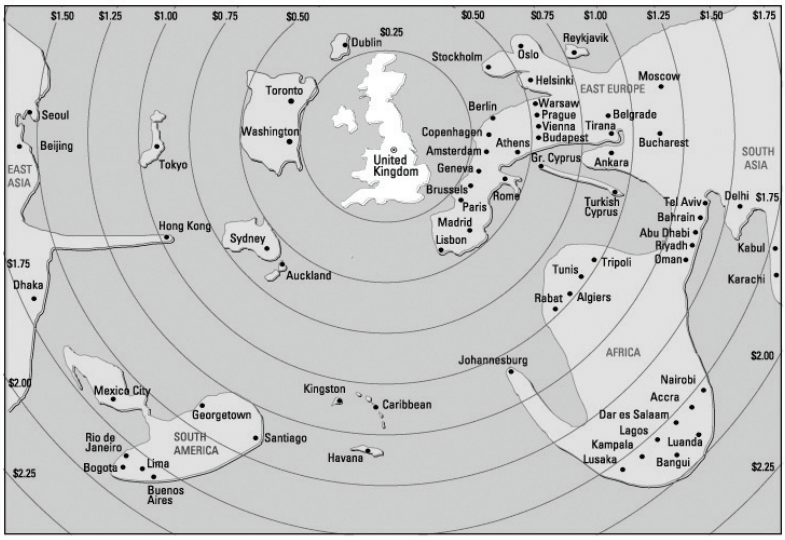
For certain purposes, concepts of space emerge that do not rely on the factor 'geographic distance' as the principal relation between things. In many everyday situations, space is a flexible concept and constructed in a problem-orientated manner. Let me provide a very simple example: I have recently moved house and now live several hundred kilometres closer to my parents' home than I used to. Much to my parents' dismay, however, I now live significantly further away from the nearest airport offering flights to their home town. Therefore, while having moved closer in terms of geographic distance, for all practical purposes it feels as if I had moved further away from my parents' place.

In everyday life, we are not consciously dealing with separate concepts of space that change and adjust when we look at a different issue. Rather, our general image of space tends to be multi-faceted and somewhat blurred by accommodating a multitude of different relational patterns at the same time. While such a concept of space works absolutely satisfactorily and flexibly in daily routine, it cannot serve as a basis for academic analysis. Therefore, I suggest thinking of space as a theoretically infinite number of spaces defined by our research questions and scientific interest. The nature of relations between the individual objects defines the nature of space – and there are as many possible spaces as there are potential sorts of relationships. From this perspective, geographic space is but one variety of space in which objects are arranged according to their geographic distance. Some eclectic examples for other spaces could be:

- *communication space*: how long does it take to communicate between two objects (e.g., people, apparatuses, institutions)?
- *transport space*: how long does it take to transport something specific (e.g., mail, cargo, people) from one place to another?
- *telephone cost space*: how much does it cost to make a telephone call between two locations?
- *transport cost space*: how much does it cost to transport something specific from one place to another?

[27] Löw, *Raumsoziologie*, 93-94.

Figure 1: Example of a Map of Telephone Cost Space Showing the Price per Minute in US$ of an International Telephone Call from the United Kingdom in the Year 1998.



Source: TeleGeography Research, Tariff Map United Kingdom 1998, http://www.telegeography.com/ee/free_resources/figures/tarrif_map-04.php (last accessed September 24, 2008.

As can be seen in these examples, the question defines the relation between objects and, therefore, the nature of each particular space. In figure 1, an extract of *telephone cost space* is represented. The places on the map are arranged according to the amount of money it cost to make a telephone call from the United Kingdom to that particular place in the year 1998. As the visualized data focuses exclusively on calls from the UK, the map shows only a specific detail of *telephone cost space* – but this is enough to illustrate that it is fundamentally different from geographic space. The locations of, for instance, Australia or Japan in figure 1 are clear testimony to this.

Many more questions could be added to those mentioned above and would then create new hermeneutical spaces. Even within the offered examples further differentiations can be found. *Transport space*, for instance, does not need to be the same for people and cargo – or for solid and liquid cargo (think of pipelines). Every new interest or question produces its own space. Sure enough, in most cases, closely related questions will generate similarly structured spaces with strong overlaps – but rarely will two spaces be completely identical.

The objects serve as interfaces between the different spaces. From the perspective endorsed here, space is relative and created only through the relations between the objects arranged in space. Our intellectual understanding of space can work only through the object. On the one hand, the multitude of possible relations between objects makes a multitude of different spaces necessary. On the other hand, it is the object itself that allows us to intellectually handle the confounding abundance of spaces. It is the focal point in which spaces touch. And accordingly, the objects are the interfaces through which different spaces can interact with each other, impact on each other and influence our perception or concept of space.

The Relation of Space and Time in Globalization

In several publications on the information age Manuel Castells has developed the idea of the *space of flows* in which he criticizes the disconnected treatment of time and space. His concept of the *space of flows* provides an alternative to the *space of places* (i.e., geographic space). The *space of flows* constitutes itself around practices of time-sharing made possible by advanced communication technology and detached from concerns of geographic proximity. The *space of flows* is an example for a version of space with an extremely pronounced time-dimension. It is closely related to what I have randomly called *communication space* but differs in the details as long-distance time-sharing depends on communication while communication does not always lead to time-sharing. Castells provides us with an alternative model of space in information societies that drops geographic distance in favour of time as the prime relational factor. And yet, as Manuel Castells acknowledges himself, the *space of flows* is only one of many relevant spaces.[28]

In the analytical model outlined here, time is connected with space only if the defining question is time-related. If we take another look at the eclectic examples given above, the first two have a time dimension. The relations between objects in *communication space* or *transport space* mirror how long it takes to communicate or transport something between them. There is an obvious time-space relation. Instances of time define space. In other cases, however, time is not connected with space – *telephone cost space* or *transport cost space* can serve as examples. These spaces are formed without time or duration playing any part in the process. Importantly, geographic space belongs into this category as well. In the perspective suggested here, geographic space is defined solely by the distance between objects. There is no dimension of time. Sure

[28] Manuel Castells, "Informationalism, Networks, and the Network Society: A Theoretical Blueprint," in *The Network Society: A Cross-Cultural Perspective*, ed. Manuel Castells (Cheltenham and Northampton: Edward Elgar, 2004), 36-37.

enough, people or things can move through geographic space and, in doing so, change their relations and, therefore, space itself – but this is not a time dimension in our sense of the word. It merely says that geographic space exists in time – but it is not shaped or transformed by time itself but rather by movements, by changing positions and distances.[29] Of course, as processes, these movements do have speed and duration and, therefore, produce their own time-related spaces (e.g., *transport space*, *travel space*).

Space cannot be annihilated – neither together with time nor by time itself. The popular phrase of the 'annihilation of space and time' by new transport or communication technologies cannot hold true. And the same goes for Marx' 'annihilation of space with time.' Quite on the contrary, new technologies as well as new economic systems have created their very own spaces in which common objects are arranged and connected along new criteria. These new spaces do not replace existing spaces (such as geographic space) but represent a new form of connectedness or interaction between objects in space. A new form of space is created that is entangled with other spaces through its objects. Let us use transport as an example to elaborate further: Geographic space remains untouched and fully intact by the expansion of transport networks. Cities, people, things keep their geographic relations to each other – unless they move (or are moved). If they move, they change their relative positions and, therefore, the structure of geographic space. This is all that geographic space is concerned with – the positions of its objects in relation to each other. The movement itself, however, takes place according to factors represented by other spaces (e.g., duration, speed, cost). All these spaces influence the process of moving but should be treated as separate layers that represent different sorts of connections between the moving object, its point of departure and its destination.

While space has not been annihilated, telecommunication technologies have, however, diminished communication time between many objects in geographic space. Does this then mean that time has somehow been annihilated and that at least the second part of the popular statement is correct? Again: no. Two principal arguments can be given to counter this assumption. First, the shrinking of communication times does not annihilate the factor time. Quite on the contrary, it emphasizes the importance of time differences and requires ever faster and more immediate handling of information or tasks. The time allocated to processing and applying information shrinks proportionally with communication times to avoid bottlenecks. In an environment of immediateness, time is not annihilated – it is critical. Typical contemporary examples include stock mar-

[29] Of course, the claim that *geographic* and *physical space* have no relation with time apart from existing in it, is valid only in our particular social sciences and humanities context and has no physical validity whatsoever. Since Einstein's work, physicists know very well that time and space are, indeed, fundamentally entangled.

kets and exchanges in which global transfers are made in seconds – and in which, accordingly, seconds can decide whether you buy, sell or hold prematurely or too late. There are earlier examples, too. In the nineteenth century, new transport and communication technologies brought shrinking communication times and, therefore, made the standardization of time a necessity. The International Meridian Conference in the year 1884 marks "[o]ne of the first dialogues about international standards of communication"[30] and led to the establishment of international time zones. Time keeping was standardized in order to avoid confusing differences in local times. The shorter communication times became, the more important even minor differences could be. During the General Telegraph Strike in India in the year 1908, for instance, the signallers on strike chose to omit the time and date of a telegram and, thereby, rendered the messages worthless for many purposes.[31] As can be seen, time became a globally critical factor and, therefore, Lewis Mumford rightly said that "the clock, not the steamengine [sic], is the key machine of the modern industrial age."[32]

Second, in all those spaces which are formed through time-related connections, time structures space. The emergence of a telecommunication network in the nineteenth century impacted massively on *communication space* and diminished communication time between many places or people. At the same time, however, other regions were not linked up and – relative to better connected places – communication times between this periphery and, say, London even increased. While it might seem that within the well-connected parts of the world communication times had shrunk to such an extent that they had become practically insignificant (or 'annihilated'), other regions were left unconnected. Enforced by the increasing gap between the communication centre and the periphery, time had become the crucial factor of inclusion or exclusion. Just as in our first point, the increasing relative difference between fast and slow information flow elevated the importance of time rather than making it irrelevant.

[30] Allen W. Palmer, "Negotiation and Resistance in Global Networks: The 1884 International Meridian Conference," *Mass Communication & Society* 5, no. 1 (2002): 7.

[31] Deep Kanta Lahiri Choudhury, "Treason of the Clerks: Sedition and Representation in the Telegraph General Strike of 1908," in *Beyond Representation: Colonial and Postcolonial Constructions of Indian Identity*, ed. Crispin Bates (Oxford: Oxford University Press, 2006), 312.

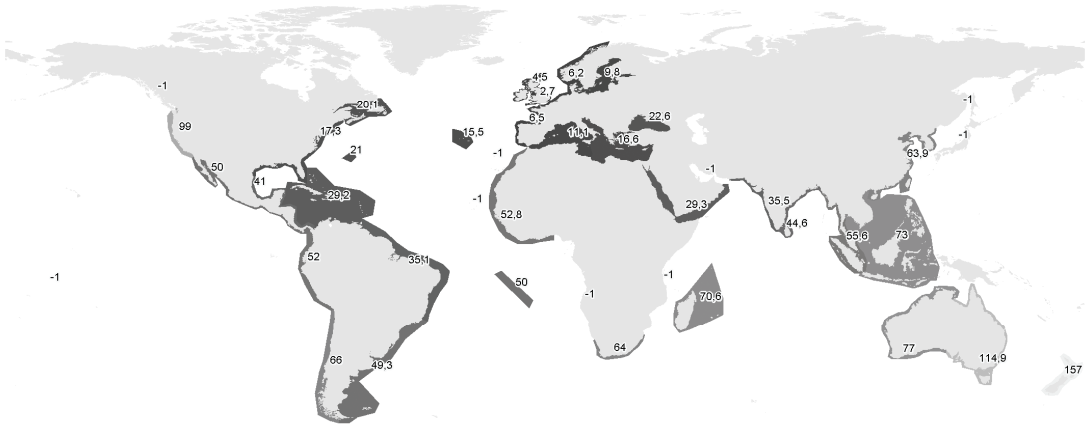
[32] Lewis Mumford, *Technics and Civilization* (New York: Harcourt, Brace & World, 1963), 14 quoted in Palmer, "Negotiation and Resistance," 8.

Example: The Submarine Telegraph Network and Global Communication Times

Briefly summing up what has been said so far, I put forward that, as historians, we should operate with a theoretically infinite number of different spaces which flexibly constitute themselves around specific interests or research questions. Some of these spaces have a direct relation with time, others (such as geographic space) have not. The crucial advantage of the proposed model is its focus on connections and interaction between objects in space – the same focus that much of global history is concerned with, as we have established in the introduction. A particular space is the abstract sum of the connections between its objects. When the pattern of connections changes, the structure of space changes as well. We have used the dramatic shifts in global communication times occurring in the second half of the nineteenth century as an evident example: due to an emerging network of telegraphic connections the structure of global *communication space* changed dramatically between 1851 and 1902.

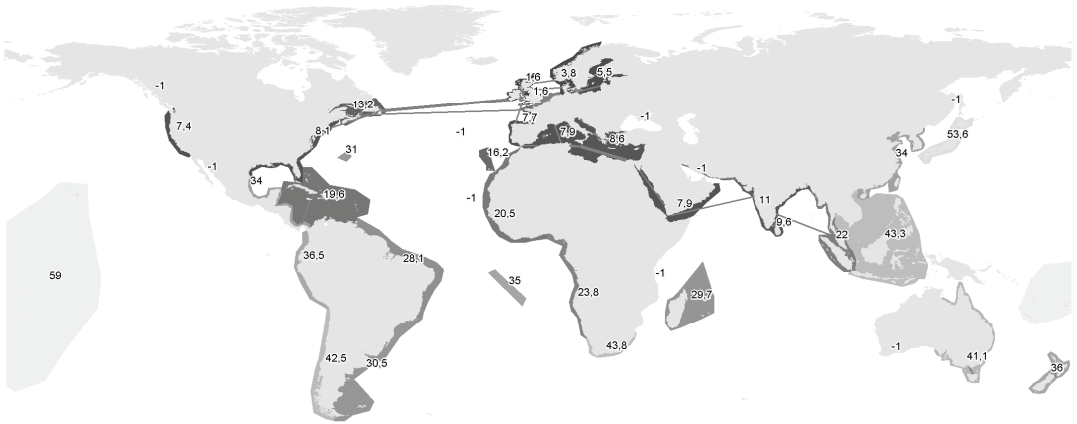
This development (as well as its modern-day equivalent encapsulated in technologies such as the internet or mobile telephony) has traditionally been referred to as a classic example for time-space compression. We have shown above that this is an inaccurate – or at least highly incomplete – description of the process. Space has not been compressed. At best, one particular form of space – *communication space* – has been re-structured and in the course of this some objects have moved closer together (or have been compressed) while others have moved further apart. The same is true for time. As only some spaces are functions of time, only those do have a relation with time at all. At best, we can conclude that *some* spaces – e.g., global *communication space* – have been *partially* compressed while other parts have not.

Figure 2: Submarine Cable Network and Global Communication Times to London (in days), 1850.



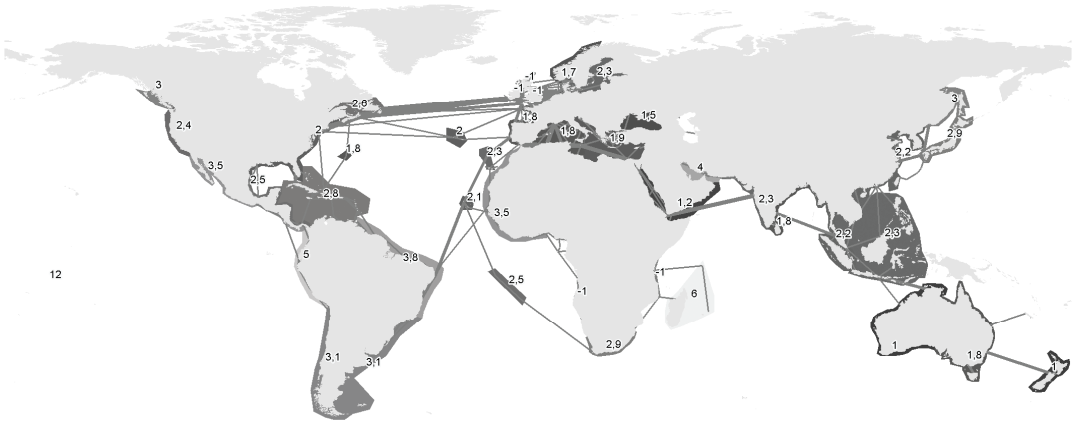
Source: Bureau International des Administrations Télégraphiques, "Nomenclature des Cables Formant le Réseau Sous-Marin de Globe," *Journal Télégraphique* 3, no. 12 (1875); 3, no. 29 (1877); 7, no. 5 (1883); 6, no. 4 (1887); 8, no. 9 (1889); 16, no. 4 (1892); 27, n/a (1894); 21, no. 11 (1897); 25, n/a (1901); 27, n/a (1903); Ship News, *The Times*, January, March, April, June, July, September, October, December, 1850.

Figure 3: Submarine Cable Network and Global Communication Times to London (in days), 1870.



Source: Bureau International des Administrations Télégraphiques, "Nomenclature des Cables Formant le Réseau Sous-Marin de Globe," *Journal Télégraphique* 3, no. 12 (1875); 3, no. 29 (1877); 7, no. 5 (1883); 6, no. 4 (1887); 8, no. 9 (1889); 16, no. 4 (1892); 27, n/a (1894); 21, no. 11 (1897); 25, n/a (1901); 27, n/a (1903); Latest Shipping Intelligence, *The Times*, March, April, June, September, December, 1870.

Figure 4: Submarine Cable Network and Global Communication Times to London (in days), 1900.



Source: Bureau International des Administrations Télégraphiques, "Nomenclature des Cables Formant le Réseau Sous-Marin de Globe," *Journal Télégraphique* 3, no. 12 (1875); 3, no. 29 (1877); 7, no. 5 (1883); 6, no. 4 (1887); 8, no. 9 (1889); 16, no. 4 (1892); 27, n/a (1894); 21, no. 11 (1897); 25, n/a (1901); 27, n/a (1903); Mail & Shipping Intelligence, *The Times,* March, June, September, December, 1900.

Regarding the example at hand this means that, indeed, a good part of the world moved communicationally closer together in the second half of the nineteenth century while the rest of the world remained distant even in terms of communication. Figures 2, 3 and 4 illustrate this. They visualize the expansion of a global submarine telegraph network and provide information for the years 1850, 1870 and 1900. The lines symbolize the submarine cables in place in the particular year. The greyscale colouring and the figures indicate the time (in days) it took to communicate between London and a particular world region in that year. While the information on cable routes and capacities has been taken directly from the *Nomenclatures des Cables Formant le Réseau Sous-Marin de Globe*,[33] data on communication times have been gathered differently. They are based on shipping information collected by Lloyd's and published almost daily in *The Times*.[34] Readers were informed about the departures and arrivals of merchant ships all around the globe. As this is important business intelligence, it is reasonable to assume that *The Times* published the information as soon as possible. The difference between the date of publication and the date of the arrival/departure of a ship in a particular port is, therefore, a reasonably exact indicator for the minimum communication time between London and this port (under regular circumstances, not in cases of emergency).

Unsurprisingly, the data in figures 2, 3 and 4 demonstrate that, indeed, the world moved communicationally closer together in the late nineteenth century. In 1850, before the first submarine cable went operational, we see huge differences in global communication times. Geographic distance obviously is a decisive factor, even if not the only one. Australia and New Zealand are both geographically and in terms of communication times very far from London. Newfoundland, on the other hand, is nearer to London than the east coast of the United States, and still communication was faster between New York and London. In general, however, global *communication space* is still closely related to geographic space in the year 1850.

Twenty years later a submarine network had emerged that primarily connected North America, Europe and South Asia via the Atlantic and the Mediterranean. Along this axis, communication times to London had shrunk considerably. Australia and New Zealand had also been connected more closely to the imperial centre even if they had not yet been directly linked up with a telegraph cable. In other regions of the world – such as South America or Africa – communication times had also been reduced but not nearly as much as in the well-

[33] Bureau International des Administrations Télégraphiques, "Nomenclature des Cables Formant le Réseau Sous-Marin de Globe," *Journal Télégraphique* 3, no. 12 (1875); 3, no. 29 (1877); 7, no. 5 (1883); 6, no. 4 (1887); 8, no. 9 (1889); 16, no. 4 (1892); 27, n/a (1894); 21, no. 11 (1897); 25, n/a (1901); 27, n/a (1903).

[34] Ship News, *The Times*, January, March, April, June, July, September, October, December, 1850; Latest Shipping Intelligence, *The Times*, March, April, June, September, December, 1870; Mail & Shipping Intelligence, *The Times*, March, June, September, December, 1900.

connected zones. While these regions had moved closer to London in absolute terms, they had been pushed further away from a relative perspective by 1870.

Another thirty years later in 1900, the submarine network connected most of the world's coastal regions. It was closely integrated and communication times in all parts of the network had shrunk dramatically. Figure 4 impressively shows that *communication space* had detached itself almost completely from geographic space. By now, Australia and New Zealand were communicationally closer to London than North America or parts of Europe. Also, the relative gap between well-connected and less-connected regions had become less pronounced, but still the difference was considerable. Time was ever more of the essence. Compared to the incredibly well-integrated regions of North America (east coast), Europe, India or Australia, more distant parts – such as South America, South Africa, the African west coast or the islands of the Indian Ocean – were at a distinct communicational disadvantage. While much of *communication space* had, indeed, shrunk (or been compressed) during the last fifty years, some parts had moved much closer together than others. A forerunner of today's digital divide had come into existence.

The emergence of the submarine telegraph network exemplifies how global *communication space* moved further and further away from geographic space in the late nineteenth century. It also illustrates that, from a relative perspective, the so-called compression of time and space applied only to certain well-connected parts of the world while other parts remained relatively remote. If, however, we want to fully understand the socio-economic and cultural significance of the transformation of *communication space*, the structures of other spaces must be borne in mind and related to this process. In the following I intend to provide only two eclectic and very brief examples which illustrate how exactly different spaces can interact with each other. It is shown how the understanding of space put forward in this article can help in analyzing the effects of changing connectivity patterns on different levels. One of the examples deals with the already introduced case of the global telegraph network in the nineteenth century, the second one is more contemporary but could certainly be adapted to the nineteenth-century as well.

Example 1: After several aborted attempts, a transatlantic telegraph cable eventually connected the United Kingdom and Newfoundland in August 1858. The connection did not last long but among the messages sent and received was one that cancelled the mobilization of two British regiments in Canada that had originally been ordered to India to put down the Indian Uprising (which had long since been achieved). This just-in-time cancellation saved the British Crown an impressive sum of money and has allegedly been instrumental in advertising the advantages of shrinking intercontinental communication times. While *communication space* around the United Kingdom, India and North America had been 'compressed,' the actual shipping of the troops would have been taken place in global *transport space*. Here technologies such as the rail-

way or steam shipping brought structural changes as well, but still intercontinental transport was a lengthy and costly affair. In other words, the particular structures of *transport* and *transport cost space* made investments in telecommunication technology attractive. Accordingly, the different spaces were closely entangled and impacted on each other.

Example 2: Today, ongoing technological development and shrinking communication times allow time-sharing – to speak with Manuel Castells – over great geographic distances and facilitate a global division of labour. European companies can effectively outsource their production to Asia (or other parts of the world). In *communication space* (or in the time-sharing *space of flows*) the two participants are closely integrated – but in other spaces they might be literally worlds apart. Examples that spring to mind could be a *language space* in which the quality of mutual linguistic understanding is the defining factor; or a *mutual knowledge and trust space* in which the degree of mutual knowledge as a foundation for mutual trust in business relations is the crucial criteria; or a *legal space* in which the compatibility of the legal systems at both ends and therefore the security of investments is a factor; or, as in example 1, a global *transport space* according to which the products will eventually be transhipped. As we can see, participants in the global division of labour are connected through more than just time-sharing practices. Various spaces are created and similarly linked through the process.

Brief and sketchy as they may be, these examples illustrate that a number of different spaces describe or symbolize the complex relation(s) between two objects. Often shifts occur only in one or more particular spaces while others remain unchanged. Our understanding of space allows for the isolated analysis of such changes on the very level they occur on. In global history, this practice holds several advantages. First, most historians will probably not be interested in shifting relations and connectivity patterns simply for its own sake. Informative as this might be, our key interest should be how such spatial transformations impact on culture, society, economy or the individual. Questions related to our communication example could be: How do mutual perceptions or flows of information over a great distance change? Do individual horizons broaden? Do changing connectivity patterns bring about a new form of inclusion and exclusion in a global public sphere, in world trade or in international politics?

Second, the model recognizes all sorts of different co-existing spaces. Established perceptions of space are not 'annihilated' or overthrown. They are incorporated in the model and retain their area of validity and usefulness. Geographic space, for instance, has not been rendered irrelevant. Many forms of interaction between objects in space depend on geographic factors. The concept of the *space of flows*, for instance, can also be incorporated. The model is strictly complementary and not mutually exclusive.

Third, our spatial concept allows for a non-elite analysis of transformations in space. Jeremy Stein rightly pointed out that "interpretations of time-space

compression typically rely on accounts of privileged social observers, and are thereby elitist."[35] Even if our concept of space does not recognize a compression of space and/or time, Stein's observation holds true from his perspective. Only a very small privileged group of mostly Western administrators and businessmen really witnessed a transformation of global *communication space* in the nineteenth century. By far the biggest part of the world's population had no access to or even knowledge of the new communication technologies. In other, indirect ways common people's lives would sooner or later be affected by newly defined global relations, but their perceptions of space were essentially different from those of the privileged group. Our model allows for an individual, non-elite treatment of space and acknowledges that each group (or even person) has a unique perception of (global) space in which different relational spaces play different roles.

Fourth, the concept also offers a new perspective on the relation between the global (space) and the local (a particular object or group of objects in space). When shifts in a particular space occur, the relation between the global and the local also changes on a certain level. The focus on one set of relations at a time and the relativistic nature of the concept can help to visualize these changes. It emphasizes the multitude of different connections between the local and the global.

A fifth and final advantage can be seen in the universal applicability of the model across all subfields or fashions in history. It can be applied in economic or social history, the history of culture, the history of technology or any other field. It lends itself to positivist views on history just as readily as it can provide a framework for constructivist or poststructuralist studies.

Space as an Observational Framework

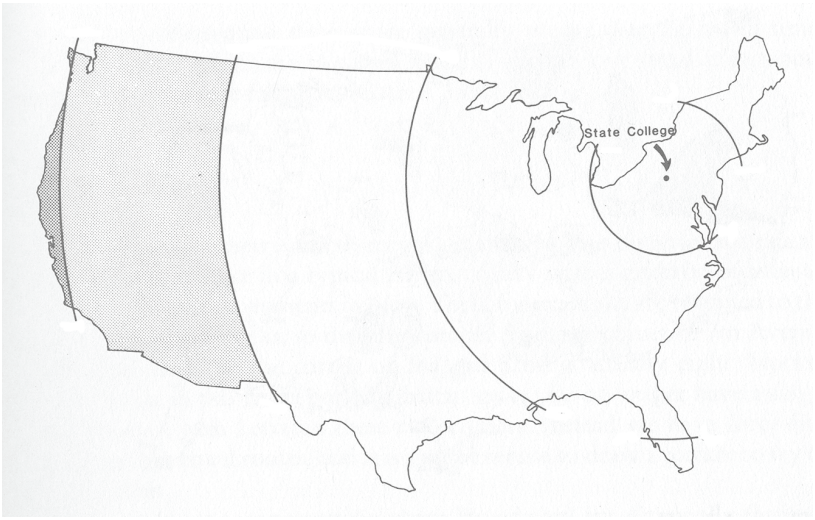
As we have seen, geographic space has not been disempowered or made irrelevant. There has been no annihilation whatsoever. Rather it should be treated as one distinct pattern of relations among many others, which are – from an analytical viewpoint – just as "real" and relevant. If we accept this, we must then ask ourselves why geographic space still serves as the principal system to order information or knowledge about the world. Even if they display information on entirely different relationship patterns (see, for instance, figures 2, 3 and 4 on global *communication space* or figures 5 and 6 on *transport* or *travel space*) they do so on a geographic 'backcloth.'[36] The actual information is still arranged within a geographically dominated framework of continents, national

[35] Stein, "Reflections," 107.

[36] For a discussion on geographic space as a 'backcloth' see Gould, "Dynamic Structures of Geographic Space."

borders and city locations. Instead of using the instantly recognizable marker of 'distance' on the map to depict the very set of relations that needs to be communicated (e.g., communication or transport times), it is reserved for geographic distance. On this geographic backcloth second-degree markers are then used to visualize the complementary spatial patterns in question. Among other things figures, colourations, lines (and their thickness) can be used as such second-degree markers.[37] If chosen carefully, these second-degree markers can convey an astonishing array of spatial information. And yet, the geographic framework is always the dominant order system. It is instantly recognized by the reader and all further information is accordingly arranged within it. The "other" spatial information can then only be seen through this geographic filter and often loses much of its persuasive power.

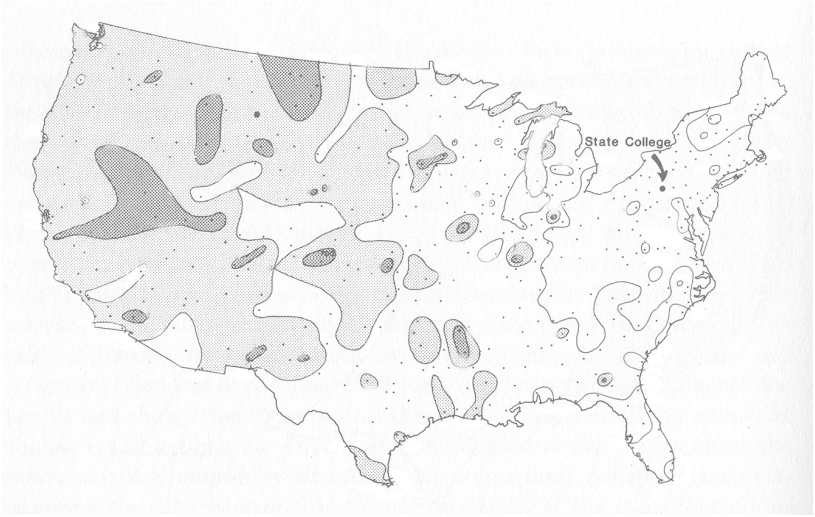
Figure 5: The Isochronic Surface of Travel Time from State College, Pennsylvania, for the Owner of a Helicopter.



Source: Peter Gould, "Dynamic Structures of Geographic Space," in Collapsing Space & Time. Geographic Aspects of Communication & Information, ed. Stanley D. Brunn and Thomas R. Leinbach (London: HarperCollins, 1991), 7.

[37] In figures 2, 3 and 4, for instance, the thickness of the red lines shows the number and capacity of individual telegraph wires between two places. The numbers refer to communication times (and, therefore, to communication space) and so does the pattern of colouration (the darker the grey the shorter the communication time). In figures 5 and 6 the numbers and different shadings give the travel times from State College, Pennsylvania.

Figure 6: The Isochronic Map from State College, Pennsylvania (April, 1987) Reflecting the Actual Structure of Commercial Airlines. Departure at 6:50 a.m. to Harrisburg, or 7:05 a.m. to Pittsburgh, is assumed.



Source: Peter Gould, "Dynamic Structures of Geographic Space," in *Collapsing Space & Time. Geographic Aspects of Communication & Information*, ed. Stanley D. Brunn and Thomas R. Leinbach (London: HarperCollins, 1991), 8.

What is the reason for this? Why not drop the geographic layer when we want to visualize *communication* or *transport space*? Why not use the immediately recognizable marker of 'distance' to convey our central message? Why not draw up a map in which the distance between the objects is a function of communication time? Only very rarely one encounters such maps which work only for extremely specialized purposes with a strictly limited number of relations. In such cases, geographic information is exclusively conveyed through corresponding nametags – and nevertheless the recipient immediately seeks to place this alternative spatial pattern within his/her 'mental map' of geographic space. Even when the actual map ignores it, geographic information is re-infused into it by the reader. In some such maps (see figure 1) this re-infusing of geographic space is supported by including certain clues such as the slightly transformed but still familiar silhouettes of continents. This helps the recipient in geographically locating the alternative spatial information. In most cases, however, the step of dropping geography is never implemented in the first place.

Several different reasons for this can be identified. To start with, many spatial relationships cannot be visualized adequately in two dimensions. Admittedly, geographic space is also three dimensional, but by using various different projections and by dropping elevation from most maps, it can be meaningfully

adapted to two dimensions. The same is often not possible for more abstract forms of space. To clarify what I mean: In *communication cost space*, for instance, it is perfectly possible – even likely – that several objects have the same relation among each other. It costs exactly the same amount of money to communicate between each one of them. If this connectivity patterns shall be visualized through the marker 'distance,' three objects at most can be arranged correctly in two dimensions – as vertices in an equilateral triangle. Even in a three-dimensional visualization, not more than four objects with the same distance among each and every one of them can be depicted – as vertices in a regular tetrahedron. Therefore, in many cases, abstract spatial relationship patterns do not lend themselves readily to distance-based visualization.

In addition to this mainly practical problem, another factor contributes to the prevalence – and actually to the necessity – of a geographic backcloth in most visual representations of space. First, as already pointed out, our individual perception of space is based mainly on geographic space. When we see, hear or touch something, our senses immediately relate it to other objects in geographic space. It is a particular form of orientation that also applies to our historical knowledge. Karl Schlögel says:

> All our knowledge about history clings to places. Pars pro toto we speak of Downing Street No 10, the Kremlin or the White House. Historical dates converge with locations: with Alexander's Battle at Issus, with the crossing of the Rubicon, with Waterloo, Stalingrad or the intersection in Dallas, where Kennedy has been assassinated. We 'orientate' ourselves. We cannot do without images of the locations, where things took place. History takes place – *Geschichte findet statt*.[38]

Based on our everyday experiences of seeing, hearing, touching and moving through geographic space, we automatically tend to arrange all sorts of information and knowledge in this geographic grid. Knowledge about history is no exception. Even if, as we have seen above, modern telecommunication technologies start to transform our (and our children's) perception of space, geographic space will enjoy a privileged position in our "space-mix" as long as we receive most of our sensual information by unmediated seeing, hearing and feeling.

The omnipresence of maps or map-like depictions enhances our tendency to arrange knowledge in geographic space. As a way of neatly visualizing spatial

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[38] Schlögel, *Im Raume lesen wir die Zeit*, 70. [My own translation]
The original German version: "*All unser Wissen von Geschichte haftet an Orten. Wir sprechen pars pro toto von Downing Street No 10, Kreml oder Weißem Haus. Geschichtliche Daten fallen mit Tatorten zusammen: mit Alexanders Schlacht von Issos, mit dem Überschreiten des Rubikon, mit Waterloo oder Stalingrad oder auch der Straßenkreuzung von Dallas, wo das Kennedy-Attentat geschah. Wir 'orientieren' uns. Wir kommen ohne Bilder von den Schauplätzen, an denen sich alles ereignet hat, nicht aus.* History takes place – *Geschichte findet statt.*"

relations that are too large and complex to be taken in undigested, maps profoundly form our perception and understanding of geographic space. In many ways, maps as representations of space replace the real thing as the principal knowledge grid. Satellites provide us with accurate bird's-eye views of cities, countries, continents or the entire globe. The silhouettes of continents or national states are widely used symbols and are instantly recognizable. As Schlögel aptly put it, all of our knowledge clings to places – and their representations on maps. Therefore, newly generated historical knowledge needs to carry some geographic tag in order to make it anchorable in our existing knowledge grid.

However, regarding studies that focus on processes of globalization, interactions and transfers, a distinct problem arises from our fixation on geographic space. Matthias Middell recently reminded us that globalization is, indeed, a multi-layered process in which allegedly outdated forms of spatial organization (such as nation states) still play a decisive role.[39] All these different layers (e.g., local, national, regional, supranational, global) create their own spaces that need to be taken into account. As we have seen, the creation and transformation of space itself becomes a field of study in global history. But how can we then define and delineate a particular object or area of study when multiple spaces need to be examined and the focus on connections and transfers blurs all clear borders? How can we arrive at a clear-cut space of study that we will need in order to tag our work and its results geographically? The answer is, actually, all too obvious. Our set of research questions defines the space of observation. As we have seen, every question that revolves around patterns of connectivity or relationships automatically creates its own space (or probably spaces) in which all relevant and related objects arrange themselves. In many cases we will need to delineate a central area of study for reasons of comprehensibility and practicability. But if we do so, this core area needs to be identified in the space(s) created by our research question – not on the basis of geographic space. The selection of case studies, for instance, must take into account constellations and transformation processes in the question's space, not in geographic space. In the former, a cluster of objects might have intensive connections and, therefore, be "close together," while it spreads far and wide in the latter. In short, objects of study such as diasporic communities, trade flows or telecommunication networks cannot be delineated geographically.

In practice, most historians will, however, encounter difficulties in letting the research question alone create their space of enquiry. Patrick Manning reminds us that "data are neither given nor collected at the planetary level. Data come generally from local levels, though much of the twentieth century data

[39] Matthias Middell, "Der spatial turn und das Interesse an der Globalisierung in der Geschichtswissenschaft," in *Spatial turn. Das Raumparadigma in den Kultur- und Sozialwissenschaften*, ed. Stefan Döring and Tristan Thielmann (Bielefeld: transcript, 2008), 117.

have commonly been aggregated at the national level."[40] Therefore, a lack of data or incomparability of certain data sets can "force" a geographically defined focus on historical studies that has little to do with the actual research interest. Furthermore, the limited skills and background knowledge of all investigators erode the integrity of our observation space. Most historians have been trained with a regional (or national) emphasis – and they speak a limited number of languages and read a limited number of scripts. These are just some of the practical constraints that a focus on 'question space' faces and which we will have to accept. For the consistence of a global historical study, however, it is essential that 'question space' forms the argumentative basis for selecting an area of observation – even if practical reasons then force us to focus on specific subareas *within* this space. In any case, such a constrained limitation of a study's reach must be explicitly acknowledged in order to provide interfaces for complementary works.

Let me briefly provide an example from my own work to illustrate what I mean. In a recent article I have – among other things – tried to establish the positions and roles of different European cities in the global telecommunication network.[41] I have done so with the help of Social Network analysis methods and have been able to clearly determine various degrees of global connectivity for a number of evaluated places. However, in several points my study somewhat differed from the ideal described above. First, I focused on European cities exclusively, while a look at the entire (i.e., global) network might have revealed far more interesting insights. Depending on the larger research interest and background such a focus on Europe can definitely be justifiable, but in my case the availability of sources dictated the limitation. I based my evaluation on a detailed and extremely informative map depicting existing direct circuits between European cities in the year 1923. To my knowledge, no such maps for other world regions exist. Therefore, the focus on Europe was imposed on me by the sources. Even more problematic was the fact that the map truncated all connections beyond Europe and merely hinted at them. For a precise network analysis, however, the entire network should be taken into account. While educated estimates can serve as a partial remedy for this shortcoming, *global connectivity space* was severely maimed by the incompleteness of the source. This illustrates how practical constraints and considerations naturally influence the work of the historian.

At the same time, however, the study also serves as an example for successfully delineating a field of study with question space – i.e., *global connectivity space*. Within the geographic corset of Europe, the field of study was demarcated by the degree of centrality of the evaluated cities. Only those with sufficient centrality in the network were considered and accordingly studied. There-

[40] Manning, *Navigating World History*, 270.
[41] Wenzlhuemer, "Dematerialization."

fore, the cities' position in *global connectivity space* (in this case constituted by the degree of centrality) was used to delineate the field.

Conclusion

Since their beginnings, global and world history struggle with the problem of pursuing global (or near global) research questions and interest, while their practicing historians have enjoyed more specialized training and usually concentrate on one or more regions in their work. The globe is more like a maximum container of different fields of research, not a natural spatial delineator. And traditionally accepted units of study such as nation states, ethnic communities or even continents can serve as auxiliaries only when the actual focus of research rests on patterns of communication, interactions, contacts and transfers. In global history, it is almost impossible to meaningfully use delineators in geographic space in order to isolate one's field of study. This can be a necessary second step (owing mostly to practical considerations) after a clear research interest has created a space of its own in which the field of study can be identified more adequately. The multi-layered model of space introduced in this article can certainly help in doing this.

Even more importantly, however, it provides us with an analytical tool to analyze shifting spatial patterns as such. Globalization is itself a multi-layered process and impacts massively on patterns of relations between different people, nations or regions. If we agree to understand 'space' as the sum of particular forms of relation between all its objects, then new spaces are constantly created, existing spaces are constantly transformed. Only if we analytically detach these spaces from geographic space will we be able to fully understand how processes of globalization work. We will then have a tool to examine, for instance, new patterns of inclusion and exclusion in the world or to look at the relation between the global and the local from a new perspective. Our abstract, multi-layered and purely relativistic model of space will allow us to examine individual processes and shifts in globalization with the attention they deserve without losing the broader perspective of their interplay.

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